

The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte RICHARD A. HAIGHT, PETER P. LONGO
and ALFRED WAGNER

Appeal 2007-0108
Application 10/698,884
Technology Center 1700

Decided: December 1, 2006

Before KIMLIN, GARRIS and JEFFREY T. SMITH, *Administrative Patent Judges*.

KIMLIN, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 1-6, 8-14, and 20-25. Appellants submit that the “separate rejection of dependent claim 7, which depends from claim 1, is not being presented for review in this appeal” (Br. 5, paragraph four). Claims 1 and 23 are illustrative:

1. A method of depositing one or more elements on a substrate, the method comprising the steps of:

providing a donor compound suspended in a carrier gas, the donor compound including the one or more elements for deposition;

passing the carrier gas with the suspended donor compound over the substrate so as to form a film of the donor compound on the substrate; and

irradiating the donor compound with optical radiation having an intensity sufficient to cause deposition of the one or more elements onto the substrate through photochemical decomposition of molecules of the donor compound within the film formed on the substrate,

wherein the intensity of the optical radiation is insufficient to cause significant photolytic breakdown of molecules of the donor compound that are suspended in the carrier gas.

23. A method of depositing at least one element on a substrate, the method comprising the steps of:

providing a donor compound suspended in a carrier gas, the donor compound including the element for deposition;

passing the carrier gas with the donor compound over the substrate so as to form a film of the donor compound on the substrate; and

irradiating the donor compound with optical radiation so as to cause deposition of the element onto the substrate through photochemical decomposition of molecules of the donor compound within the film on the substrate,

wherein the optical radiation has a pulse width that is insufficient to cause thermal absorption by the element so as to prevent thermally induced breakdown of the donor compound.

The Examiner relies upon the following references as evidence of obviousness:

Morishige
Polyanyi

US 4,711,790
US 6,319,566 B1

Dec. 8, 1987
Nov. 20, 2001

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S.A. Trushin et al., *Femtosecond Dynamics and Vibrational Coherence in Gas-Phase Ultraviolet Photodecomposition of Cr(CO)₆*, 102 Journal Phys. Chem. A 4129-37 (1998)

Appellants' claimed invention is directed to a method of depositing an element on a substrate by irradiating a donor compound that is suspended in a carrier gas with optical radiation. The optical radiation has sufficient intensity to cause deposition of one or more of the elements of the compound onto the substrate through photochemical decomposition of its molecules. Claim 23 on appeal requires that the optical radiation has a pulse width that is insufficient to cause thermal absorption of the deposited element that would thermally induce breakdown of the donor compound.

Appealed claims 1-6, 8-14, and 20-22 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Polanyi, taken alone, or in view of Morishige. Claims 23, 24, and 25 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the stated combination of references further in view of Trushin.

We have thoroughly reviewed the respective positions advanced by Appellants and the Examiner. In so doing, we agree with Appellants that the Examiner has not established a prima facie case of obviousness for the claimed subject matter. Accordingly, we will not sustain the Examiner's rejections.

We consider first the Examiner's rejection of claims 1-6, 8-14, and 20-22 over Polanyi, taken alone, or in view of Morishige. We do not subscribe to the Examiner's position that "for the claims as written, while

formation of the film may occur simultaneously with the irradiation, the claim language does not necessitate that the irradiation must occur while the carrier gas with suspended donor compound is passing over the substrate; i.e., during forming of the film” (Answer 3, last paragraph). In our view, when the language of claim 1 is given its broadest reasonable interpretation in light of the specification, the “wherein” clause implicitly requires that the step of irradiating the donor compound takes place as the carrier gas/donor compound passes over the substrate. To conclude otherwise would result in the “wherein” clause having no meaning. Manifestly, such a meaningless interpretation would not be within the requirement for a reasonable interpretation of the claim language. Moreover, even if we were to accept the Examiner’s interpretation of the claim 1 language, the claim still requires that the intensity of the optical radiation is insufficient to cause significant photolytic breakdown of the molecules of the donor compound when, or if, they are suspended in a carrier gas, i.e., the “wherein” clause is a limitation on the magnitude of the intensity of the optical radiation. Since the Examiner has provided no rationale why it would have been obvious for one of ordinary skill in the art to control the intensity of the optical radiation of Polanyi such that it is insufficient to cause significant photolytic breakdown of molecules of the donor compound, we are constrained to reverse the Examiner’s rejection.

We now turn to the Examiner’s § 103 rejection of claims 23-25. Polanyi provides no teaching or suggestion of irradiating the donor

compound with optical radiation that has a pulse width that is insufficient to cause thermal absorption by the deposited element, thereby preventing thermally-induced breakdown of the donor compound. As pointed out by Appellants, the pulse width disclosed by Polanyi is greater than the claimed duration of less than about 125 femtoseconds and less than one picosecond. In relevant part, Polanyi teaches that the pulse width may range from nanoseconds to picoseconds (*see* col. 4, ll. 43-50). The Examiner cites Trushin's research paper in concluding that it would have been obvious to one of ordinary skill in the art that Polanyi's "pulsed laser deposition process may be on a fsec time scale, and may include localized photodecomposition techniques used on Mo(CO)₆" (Answer 6, last paragraph). However, as acknowledged by the Examiner, "this research paper does not discuss the use of these dissociated metal organic precursors for any particular purpose or end use" (*id.*), and Appellants properly point out that the "reference only discusses the time-scale of the dissociation reaction, not the irradiation process as asserted by the Examiner" (Br. 15, last paragraph). While Trushin evidences that the time-scale of such chemical, dissociation reactions was known at the time of filing the present application, we concur with Appellants that the cited references neither teach nor suggest employing such short time periods as an irradiation time for deposition processes of the type claimed. In our view, the Examiner's explanation of what one of ordinary skill in the art may have done is tantamount to applying the verboten standard of what *could* have been done by one of

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ordinary skill in the art as opposed to what would have been suggested by the prior art. *In re Gordon*, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984). In essence, the Examiner has not established that one of ordinary skill in the art would have found it obvious to use radiation having a pulse width, that was known to dissociate chemical compounds, for printing an element of the compound on a substrate.

In conclusion, based on the foregoing, we are constrained to reverse the Examiner's rejections.

REVERSED

APJ Initials:

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